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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/588,901

08/09/2006

Mai Kitahara

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EXAMINER

BOYKIN, TERRESSA M

ART UNIT

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1796

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PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/588,901	Applicant(s) KITAHARA ET AL.	
	Examiner Terressa M. Boykin	Art Unit 1796	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 01 February 2008.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-10 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-10 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 31 May 2006 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date <u>11-9-06;8-9-06</u> . | 6) <input type="checkbox"/> Other: _____ |

Provisional Obviousness-type Double Patenting Rejection

The nonstatutory obviousness-type double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. See *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and, *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent is shown to be commonly owned with this application. See 37 CFR 1.130(b).

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

Claim 1 is provisionally rejected under the judicially created doctrine of double patenting over claims 1 and 3 of copending Application No.10/451779. This is a provisional double patenting rejection since the conflicting claims have not yet been patented.

The application **10/451779** claims a method for depolymerization of an aromatic polycarbonate, which comprises reacting an aromatic polycarbonate with at least one hydroxy compound selected from the group consisting of water, an aliphatic alcohol having 1 to 6 carbon atoms and a phenol which may be substituted by a hydrocarbon group having 1 to 10 carbon atoms in the critical fluid of carbon dioxide.

It is noted that in the "instant" application, claim 1 includes the term "comprising" and thus does not exclude the carbon dioxide moiety as claimed above. Even if the supercritical or subcritical state is only meant to be directed to the carbon dioxide moiety, the ambiguity of the instant claim1 allows for two interpretations. That is, water is included and the supercritical state exist for another solvent or the water is in a supercritical state as well. Note claim 3 of the reference further states "wherein the aromatic polycarbonate is reacted *with water in the critical fluid of carbon dioxide at a temperature of 200.degree. C.* or more to form an aromatic bisphenol which is a

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constituent component of the aromatic polycarbonate. Since the supercritical temperature of water, i.e. 374°C and would overlap the "temperature of 200 degree C or more" as claimed.

Nevertheless, it would have been obvious to use water in a supercritical or subcritical state since such is suggested in claim 1 and specifically stated/claimed in claim 3 of the application. In this instance the claimed subject matter overlaps in a manner within the boundaries of the USPub reference and the instant claim allows for an obviousness-type double patenting rejection to be permissible.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C.

102 that form the basis for the rejections under this section made in this

Office action:

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1 is rejected under 35 U.S.C. 102(b) as being anticipated by USP 6255529 cols.2-col. 5 line 45, claim figure 1. .

Applicants claim is directed to a polycarbonate decomposition method comprising decomposing a polycarbonate with water in a supercritical or subcritical state.

USP 6255529 is directed to a method of *decomposing wastes* containing target compounds having one or more of hydrolyzable bonds of ether bond, ester bond, amide bond and isocyanate bond wherein the method comprises continuously supplying the wastes in a molten state or liquid state to a reactor, continuously supplying super-critical water or high pressure/high temperature water to the reactor, bringing the water into contact with the wastes, thereby decomposing the target

compounds and then recovering them as raw material compounds or derivatives thereof for the target compounds. Target compounds contained in wastes in chemical plants which could not be utilized but merely incinerated or discarded so far are continuously decomposed into raw material compounds or derivatives thereof for the aimed compound and can be reutilized effectively.

Among preferred compounds the reference states, those classified as oligomers of raw material compounds can include, for example, polyester oligomers (having ester bond) such as polyethylene terephthalate, and polycarbonate. The polyester oligomers include cyclic ester oligomer or chained oligomer which can be decomposed into a dicarboxylic acid such as terephthalic acid and a diol.

Further, the polycarbonate oligomers can be decomposed into a polyhydric alcohol or polyhydric phenol and carbonic acid as the raw material.

Thus, the reference discloses a method for decomposing a polycarbonate as claimed by applicants. In view of the above, there appears to be no significant difference between the reference and that which is claimed by applicant(s). Any differences not specifically mentioned appear to be conventional. Consequently, the claimed invention cannot be deemed as novel and accordingly is unpatentable.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior

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art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 2-10 are rejected under 35 U.S.C. 103(a) as being unpatentable over see USP 6255529 cols. 1- 4, abstract, claims in view of Reference

With regard to **claim 2**, wherein the polycarbonate is a polycarbonate contained in a thermoplastic composition containing the polycarbonate.

With regard to **claim 3**, wherein the polycarbonate is an aromatic polycarbonate and its decomposed product is an aromatic dihydroxy compound. It is well known in the art that a polycarbonate may be prepared from the basic aromatic dihydroxy unit and thus decompose through hydrolyzing thereto. It would have been obvious to one of ordinary skill would employ the process of decomposition using a supercritical fluid to achieve an aromatic dihydroxy compound since the decomposing of a polycarbonate would naturally afford an aromatic dihydroxy component.

More over, with regard to **claims 3 and 4**, when chemical compounds have “very close” structural similarities and similar utilities, without more a prima facie case may be made, In re Wilder, 563 F.2d 457 (CCPA 1957); i.e., obviousness may be based solely upon structural similarity (an established structural relationship between a prior art compound and the claimed compound, as with homologs). See In re Duel, 51 F.3d 1552, 1559 (Fed. Cir. 1995). The necessary motivation to make the claimed compound, and thus the prima facie case of obviousness, arises from the reasonable expectation

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that compounds similar in structure will have similar properties. In re Gyurik, 596 F.2d 1012, 1018 (CCPA 1979).

With regard to **claim 4**, wherein the aromatic polycarbonate comprises a recurring unit represented by the following formula (1) as claimed, it is noted that the structural formula as claimed is the general or basic structure of an aromatic polycarbonate compound in which an aromatic dihydroxy would result therefrom. And although, the reference does not disclose the particular polycarbonate compound that may be used, it does state that polycarbonates are included in the compounds that may be employed to produce the aromatic dihydroxy unit. Consequently, it would have been obvious to one of ordinary skill in the art that the basic structure of a polycarbonate that would decompose to an aromatic dihydroxy component would naturally flow from a structure as claimed.

With regard to **claim 5**, wherein the aromatic dihydroxy compound is recovered by crystallization.

It is well-known in the art that water at high temperatures and high pressures at or near the supercritical temperatures exhibits properties that are different from those of ambient liquid water. Most references or text manuals on Chemistry- involving Supercritical Fluids would contain therein the characteristics and properties of many known solvents including water. For example, the reference "Organic Chemical Reactions in Supercritical Water"; by Phillip E. Savage shows that each of the limitations as claimed is readily available.

These properties are very well available in the reference literature encyclopedias charts as demonstrated below.

Table 1. Critical properties of various solvents

Solvent	Molecular weight g/mol	Critical temperature K	Critical pressure MPa (atm)	Density g/cm ³
<u>Carbon dioxide</u> (CO ₂)	44.01	304.1	7.38 (72.8)	0.469
<u>Water</u> (H ₂ O)	18.02	647.3	22.12 (218.3)	0.348
<u>Methane</u> (CH ₄)	16.04	190.4	4.60 (45.4)	0.162

Thus, each of the limitations of claims 6-10 would have been obvious in view of the well documented physical and inherent properties of supercritical water. For example, with regard to **claim 8**, it is well known in the reference literature that the critical temperature for water is 374°C (647K), applicants' claimed decomposition with supercritical water would obviously have included temperatures on or above 374°C or higher. The claimed range of 374°C – 500°C would have been not only an obvious choice *but a necessary choice in temperature to accomplish the decomposition with supercritical water.* Consequently, it would have been obvious for one of ordinary skill in the art to employ supercritical temperatures of 374°C or above since such temperature range is necessary to accomplish the function. Similarly, with regard to **claim 7**, wherein the dielectric constant is claimed to be 10 or less. It is noted and published in references as 78 at 25 C or 1Mpa, 21 at 300°C and 25Mpa and down to 6 at the supercritical point which again overlaps that which is claimed by applicants of 10

or less. Thus, any dielectric constant measured at the supercritical point or higher would have been inherently and would have read on the claimed range in claim 7.

The same can be surmised of K_w of **claim 6** and the pressure as claimed in **claim 9** each of which is needed to achieve the supercritical fluid.

With regard to **claim 10**, wherein an aromatic dihydroxy compound aqueous solution is claimed containing 1 wt % or less of an aromatic dihydroxy compound dissolved in water at a temperature of 10 to 100.degree. C. and a pressure of 0.1 to 10 MPa. It would have been obvious to one having ordinary skill in the art at the time the invention was made to employ particular amounts and/or parameters as known in the art, since it is well-established that merely selecting proportions and ranges is not patentable absent a showing of criticality. In re Becket, 33 U.S.P.Q. 33 (C.C.P.A. 1937). In re Russell, 439 F.2d 1228, 169 U.S.P.Q. 426 (C.C.P.A. 1971). Generally, it is prima facie obvious to determine workable or optimal values within a prior art disclosure through the application of routine experimentation. See In re Aller, 105 USPQ 233, 235 (CCPA 1955); In re Boesch, 205 USPQ 215 (CCPA 1980); and In re Peterson, 315 F.3d 1325 (CA Fed 2003).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior

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art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1 and 2 are rejected under 35 U.S.C. 103(a) as being unpatentable over USP 6331320 see abstract, cols. 1-4 and claims.

The **USP 6331320** provides a process for producing aromatic compounds or polymers thereof from a (naturally occurring) plant material in a short period of time and by a simple procedure. The process treats the plant material with *supercritical water or subcritical water to liberate aromatic compounds*, which are contained in the plant material, *and/or aromatic compounds, which have been generated upon decomposition of components of the plant material*, to the outside of the plant material, and isolates the liberated aromatic compounds to produce aromatic compounds or polymers thereof.

Importantly, the reference discloses therein that “***various application studies are under way with regard to extraction, purification, synthesis and decomposition using supercritical fluids.*** [Such as] a method which selectively hydrolyzes or pyrolyzes ***natural or synthetic high molecular compounds*** with the use of *supercritical water as a solvent to decompose the polymers into their constituent units or into approximately oligomeric combinations of the constituent units.*”

Consequently, the reference discloses that water in its supercritical state is widely known and sought for hydrolyzing decomposable high molecular weight compounds both natural and synthetic to afford the decomposition product such as an aromatic moiety or unit. Thus, it would have been obvious to one of ordinary skill in the art to employ the method of using water at its supercritical temperature or above as carried out in the process of the reference since such affords the initial aromatic constituent unit such as an aromatic dihydroxy moiety from synthetic high molecular weight compounds which may include polycarbonate or polycarbonate compositions. .

Applicants may assert that the reference *could be* considered nonanalogous art. However, it has been held that a prior art reference must either be in the field of applicant's endeavor or, if not, then be reasonably of applicant's endeavor or, if not, ***then be reasonably pertinent to the particular problem with which the applicant was concerned***, in order to be relied upon as a basis for rejection of the claimed invention. See *In re Oetiker*, 977 F.2d 1443, 24 USPQ2d 1443 (Fed. Cir. 1992).

Consequently, the claimed invention cannot be deemed as unobvious and accordingly is unpatentable.

Correspondence

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Terressa M. Boykin whose telephone number is 571 272-1069. The examiner can normally be reached on Monday-Thursday 10-5:30 Friday (work at home).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, James Seidleck can be reached on 571 272-1078. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Terressa M. Boykin/
Primary Examiner, Art Unit 1796

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